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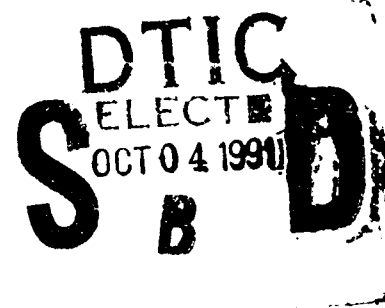
Technical Report 932

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Analysis of Army Family Research Program Measures of Individual Readiness

Robert Sadacca and Ani S. DiFazio
Human Resources Research Organization

July 1991



**United States Army Research Institute
for the Behavioral and Social Sciences**

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of individual readiness adopted by the AFRP can be used in further readiness research or to measure soldier readiness operationally.



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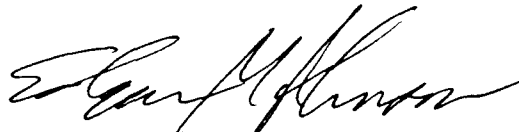
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FOREWORD

The Army Family Research Program (AFRP) is a 5-year integrated research program initiated in November 1986 in response to research mandated by both the CSA White Paper, 1983: The Army Family and The Army Family Action Plans (1984-1989). The objective of the research is to support the Army Family Action Plans and assist Army family programs and policies by (1) determining the demographic characteristics of Army families, (2) identifying motivators and detractors to soldiers remaining in the Army, (3) developing pilot programs to improve family adaptation to Army life, and (4) increasing operational readiness.

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), with assistance from the Research Triangle Institute, Caliber Associates, Human Resources Research Organization (HumRRO), and the University of North Carolina, is conducting the research. The research is being sponsored by CFSC pursuant to the LOA dated 18 December 1986, "Sponsorship ARI Army Family Research."

ARI has provided sponsors frequent updates on the major findings of this research effort. This technical report describes the development and analyses of a set of measures that can be used to assess the readiness of individual soldiers. The analyses resulted in the identification of a comprehensive reliable rating composite that could be used in further readiness research as well as operationally to measure individual readiness. Future AFRP analyses will focus on determining the relationships of family and Army factors to this measure of individual readiness.



EDGAR M. JOHNSON
Technical Director

ANALYSIS OF ARMY FAMILY RESEARCH PROGRAM MEASURES OF INDIVIDUAL READINESS

EXECUTIVE SUMMARY

Requirement:

The Army Family Research Plan of the Chief of Staff of the Army mandated research that would explore how family factors are related to retention, readiness, and adaptation to Army life. This report supports that requirement by exploring how soldier readiness should be conceptualized and measured.

Procedure:

The core of the research was a large-scale field survey of Army soldiers and their spouses and Army units and installations. Many measures of individual and family characteristics, unit environment, Army policies, programs, and practices, soldier and spouse experiences, needs and expectations, community characteristics, and perceptions of civilian alternatives were collected. In order to determine the impact of these family and Army factors on readiness, it was necessary to identify one or more reliable measures of individual readiness that could be used as the dependent variable in further analyses of the AFRP survey or in future operational or research applications involving readiness measurement.

A set of candidate individual readiness measures or dimensions was initially identified through a review of the military readiness literature. A series of workshops was held with field grade officers and senior NCOs to obtain descriptions of critical incidents that occurred in their experience and demonstrated individual readiness or lack of readiness. These incidents were analyzed by content, and a set of 12 behaviorally anchored readiness scales was developed for use in the AFRP. In addition, a number of other readiness measures were developed by the project team including self-ratings of readiness, numbers of awards, letters, and certificates of appreciation and commendation, disciplinary actions, and an overall rating scale to be completed by the commanders of the soldiers' units.

Another series of workshops was conducted in order to obtain judgments of experienced officers and NCOs concerning the relative weight that these various measures should be given in forming an overall composite index of individual readiness. Comparisons were made of the weights assigned the different measures for forming readiness composites for combat and noncombat officers and enlisted personnel.

Analyses of the readiness measures collected in the survey focused first on overcoming missing data problems attributable mostly to the failure of the supervisors of the sampled soldiers to rate their subordinates on the readiness scales. Factor analyses of the readiness measures were conducted and the Alpha reliabilities of alternate readiness composites were obtained. Finally, a composite readiness measure was computed for each soldier in the sample for which adequate readiness information was available.

Findings:

- The weights assigned the various readiness measures for forming composites for officers, NCOs, and junior enlisted personnel in combat and noncombat units were similar enough to warrant the use of a single set of weights for all soldiers.
- The 12 readiness scales, which were given the highest overall weight assigned the various measures, constituted a single factor on separate factor analyses of officer, NCO, and junior enlisted ratings.
- The most reliable measure of readiness was the average of the first- and second-level supervisory ratings on the readiness scales.

Utilization of the Findings:

The measures of soldier readiness that were developed in this part of the research are expected to be used primarily by those in research and evaluation. However, the readiness measures have also been briefed to representatives from the Office of the Deputy Chief of Staff for Operations (ODCSOPS) and the Office of Deputy Chief of Staff for Personnel (ODCSPER) for possible operational use.

ANALYSIS OF ARMY FAMILY RESEARCH PROGRAM MEASURES OF INDIVIDUAL READINESS

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ANALYSIS OF ARMY FAMILY RESEARCH PROGRAM MEASURES OF INDIVIDUAL READINESS

Introduction

Background

The Army Family Research Program (AFRP) was initiated in Fall 1986 in order to examine the role that the families of soldiers play in soldier readiness, retention, and sense of belongingness to the Army community. With the prospect of lowered military budgets and reductions in force on the horizon, the Army was concerned with how to attract and retain high quality soldiers in an all-volunteer force that consisted of high proportions of married military personnel. Since the family concerns of these soldiers could have a major impact on their willingness to remain in the Army and on their level of performance, the Army had instituted a number programs designed to assist soldiers and their families to adapt to Army life. However, hard questions were being raised concerning the effectiveness of these family programs and associated Army policies and practices in maintaining and raising individual and unit readiness and retention. For example, would the resources spent on family programs be better spent on other Army priorities? How could the family-related programs be improved? What unit and installation conditions facilitate successful adaptation to Army life? Do the family policies, programs, and practices encourage high quality soldiers to remain in the Army?

The AFRP was designed to provide information to Army decision makers concerning these and related questions and issues. The core of the research was a large-scale field survey of Army soldiers and their spouses and Army units and installations. The survey design and development of the instruments used in the survey are described in the AFRP report, Report on Survey Implementation (0005AJ) (1990). The plans for the analyses of the survey data have been documented in the report, AFRP Analysis Plan (1990). Both these reports describe the instruments used to measure the readiness, retention, and family adaptation and Army commitment, the major dependent AFRP variables in the planned analyses. The reports also describe the measures of AFRP individual and family characteristics, unit environment, Army policies, programs, and practices, soldier and spouse experiences, needs, and expectations, community characteristics, and perceptions of civilian alternatives.

The focus of this report is on the specific analysis conducted for the purpose of identifying one or more reliable measures of individual readiness that could be used as the dependent variable in further analyses of the AFRP survey data base. A companion report will focus on the analysis conducted to identify one or more reliable measures of unit readiness. These measures were developed by the AFRP primarily because of lack of agreement within the Army concerning the measurement of readiness as well as concern over the comparability across different types of units and soldiers of the existing measures. Existing Army measures of readiness tend to be unit (e.g., the Unit Status Report) or MOS (e.g., the Skill Qualification Test) specific. They generally concentrate on the "can do" aspects of readiness and not the "will do" or motivational component of readiness, which may be more influenced by family factors.

The development of the readiness measures is described in the draft report, TR 11: Definition and Measures of Individual and Unit Readiness and Family Phenomena Affecting It (1988). Further descriptions of the developmental process are given in the aforementioned AFRP reports.

Purpose of this Report

The primary purpose of this report is to describe the analyses conducted on the measures of individual readiness that were obtained on the soldiers who participated in the Army Family Readiness Project survey. The major objective of the analyses was to establish one or more reliable measures of individual readiness that could be used either as dependent variables in subsequent AFRP analyses of the survey data base or in future operational or research applications involving readiness measurement. Decisions that were made during the analyses are explained. A concluding section presents the authors' recommendations concerning the use of the available readiness measures in current and future research. Before describing the results, a brief summary of the development of the measures is given.

Development of the Individual Readiness Measures

The procedures used to develop the readiness measures and their time frames are given in Figure 1. The developmental process was spread over a two-year period owing to difficulties in obtaining required Army subject matter expert input and the necessity of coordinating the field tests of the readiness measures with that of other AFRP survey instruments. The basic approach in the development of the AFRP instruments involved utilizing the judgments of experienced Army personnel as much as possible. This was especially true of the readiness measures, since their acceptance by the Army was considered a prerequisite to the acceptance of findings concerning the impact of family factors on readiness.

A literature review initiated the development of the readiness measures for the AFRP. The review focused on previous research involving indicators of individual and unit readiness, spouse preparedness, and family and military environment factors related to readiness. An initial list of individual and unit readiness dimensions was constructed upon completion of the literature review.

Two sets of workshops were then conducted to further refine the initial list of dimensions. The first series of workshops used a critical incident methodology in which officers and NCOs from both combat and support units were asked to generate critical behavioral incidents based upon their experience in the Army. The originator of each incident indicated the degree of individual or unit readiness exemplified by the incident on a nine-point scale. The incidents were analyzed and classified by AFRP scientists who generated a list of readiness dimensions for individuals and another set of dimensions for units. Draft behaviorally anchored rating scales were constructed for each of the dimensions.

In the second set of workshops, the officer and NCO participants were asked to try out and evaluate the draft individual and unit readiness scales. The participants were asked which dimensions, when combined into a composite index, would produce the best overall measure of the readiness of individual officers, NCOs, and junior enlisted personnel. They were further asked which dimensions were most difficult to use in rating individuals and what they felt were the sources of the difficulty. The participants were also asked to identify types of individuals, if any, for which they felt one or more of the dimensions would be inappropriate for use in measuring readiness.

Upon completion of the workshops, a master working list was developed of readiness variables for which measurement instruments would be developed. The rationale underlying the selection of each variable involved three criteria: (1) it appeared reasonable to believe that high (or low) scores on the variable would be indicative of the probability that an individual would successfully complete his/her wartime mission; (2) the variable would be applicable to most if not all types of individuals; and (3) the variable could be measured reliably and relatively easily.

<u>Event</u>	<u>Date</u>
• Literature Review to Identify Readiness Dimensions	October 1987
• Subject Matter Expert (SME) Workshops to Generate/Evaluate Critical Incidents	October - November 1987
• Development of Draft Scales	November - December 1987
• First Pilot Test to Evaluate Scales	December 1987
• Revisions of Draft Scales	January 1988
• Second Pilot Test of Scales	February 1988
• Further Revisions of Scales	March 1988
• Field Test of Procedures and Instruments	March - April 1988
• Analysis of Field Test Results	June - August 1988
• Review and Approval of Readiness Instruments by CFSC, ODCSPER, ODSCOPS	September - November 1988
• Readiness Weighting Workshops	April - September 1989
• World-Wide Administration of Readiness Measures	February - December 1989

Figure 1. Procedures Used to Develop the Readiness Measures.

The preferred measurement methodology for each variable was then determined by AFRP scientists. Draft instruments were developed and field-tested. On the basis of the field test results, the draft readiness measures were further refined. Finally, the instruments were reviewed by Army readiness proponents who declared them to be adequate measures of individual readiness. The final individual readiness measures consisted of:

1. Readiness rating scales. A set of behaviorally anchored rating scales to be completed by first- and second-line supervisors of the soldiers in the core survey sample.

2. An assessment of the soldier's job performance relative to that of other soldiers in the unit. This assessment was to be completed by the unit commander for each sampled soldier.

3. A series of self-report questions presented in the Soldier Questionnaire that were designed to collect information on individual readiness. The questions query the respondent (the sampled soldier) on objectively verifiable performance information such as number of awards received, Skill Qualification Test scores, and adverse disciplinary actions.

4. A series of readiness self-rating scales on which the soldiers indicate their own perceived readiness.

5. A measure of the relative promotion rate of the individual soldiers derived from Army records. Soldiers' average time within grade are compared to that of other soldiers in the same grade.

These measures are listed in Figure 2. Appendix A presents copies of the actual measures as they appeared in the Soldier Questionnaire and on the rating forms used.

In anticipation of the requirement to form a single comprehensive measure of individual readiness from the diverse measures obtained, a series of eight workshops were held in which the participants assigned weights to the measures. Four of the workshops were held in Europe and four at Fort Carson, CO. Judgments of 71 experienced officers and NCOs concerning the relative weight that should be given the available measures were obtained in these workshops. The 71 workshop participants were divided about equally between combat and combat support personnel and officers and NCOs.¹ The participants weighted the measures separately for E2-4 enlisted personnel, NCOs, and officers. The specific instructions for assigning the weights are given in Appendix B. The weights were scaled through linear transformations so that their sum totalled to 100.

Table 1 presents the average weights assigned by the workshop participants for the measures. Taken as a set, the supervisor rating scales were assigned the highest weights for all three groups (E2-4, NCOs, and officers). There was, however, not too much variation² in the average weights assigned the individual scales, although analysis of variance results indicated that the mean weights assigned to the separate scales were significantly different ($p \leq .0001$).

The second highest average weight was assigned the unit commander ratings of the relative performance level of the soldier compared to other soldiers in the unit. The high weight given this measure and the relatively high weights given for the Enlisted and Officer Evaluation Reports indicate that the workshop participants placed a high value on supervisory ratings in comparison to the other measures.

¹ These participants were chosen by the Army and do not necessarily constitute representative samples.

² If a set of scales are fairly highly intercorrelated, and the weights assigned the separate scales are not too different, then a composite derived through applying the weights will be very highly correlated with a composite derived through simply summing or averaging the separate scale values assigned the rates.

-
1. Readiness Ratings (Completed by Supervisors)
 - Cooperation/Teamwork/Esprit de Corps
 - Effort and initiative
 - General soldiering skills
 - Individual deployability (Army task/mission)
 - Individual deployability (personal/family)
 - Job discipline
 - Job technical knowledge/skills
 - Performance under pressure and adverse conditions
 - * Care and concern for subordinates
 - * Care and concern for subordinates' families
 - * Leadership of subordinates
 - * Maintaining training status of subordinates
 2. Unit commander's ratings of each sampled soldier.
 3. Self-report performance items in the Soldier Questionnaire.

Question No.

- | | |
|----------|--|
| 38 | Time taken off duty for personal reasons last month. |
| 44 | Last Physical Readiness Test score. |
| **46 | Most recent Skill Qualification Test score. |
| ***47/48 | Most recent ER/EER evaluation. |
| ****49 | Most recent OER evaluation. |
| ****50 | Position in senior rater mass. |
| 51 | Articles 15 in past two years. |
| 52 | FLAG actions in past two years. |
| 54 | Letters of Appreciation, etc., in past two years. |
| 55 | Certificates of Appreciation, etc., in past two years. |
| 56 | Awards and decorations received in the military. |

4. Self-Ratings of Readiness in the Soldier Questionnaire

Question No.

- | | |
|----|---|
| 41 | Preparedness for wartime job. |
| 42 | Preparedness for conflict using: <ul style="list-style-type: none">a. Nuclear weaponsb. Biological agentsc. Chemical agentsd. Conventional weapons |
| 43 | Comparison of job performance with that of other soldiers. |

5. Promotion rate in comparison to other soldiers in same grade

-
- * Obtained for officers and NCOs only.
 - ** Obtained from enlisted personnel only.
 - *** Obtained from NCOs only.
 - **** Obtained from officers only.
-

Figure 2. Individual Readiness Measures Collected in Core Survey.

Table 1

Average Weights Assigned Individual Readiness Measures by Workshop Participants

Readiness Measures	E2-4	NCO	Officer
<u>Supervisory Ratings</u>			
Cooperation/Teamwork/Esprit de Corps	2.6	1.8	1.8
Effort and Initiative	2.6	1.9	2.0
General Soldiering Skills	3.0	1.8	1.8
Deployability (Army Task/Mission)	2.2	1.6	1.6
Deployability (Personal/Family)	2.1	1.4	1.4
Job Discipline	2.6	1.7	1.7
Job Technical Knowledge/Skills	2.8	2.0	2.0
Performance under Pressure/Adverse Conditions	2.5	1.7	1.9
Care and Concern for Subordinates	---	1.8	1.8
Care and Concern for Subordinates' Families	---	1.6	1.6
Leadership of Subordinates	---	2.0	2.1
Maintaining Training Status of Subordinates	---	1.7	1.6
<u>Questionnaire Items</u>			
Time off for personal reasons last month	12.6	9.9	9.7
Preparedness for wartime job	3.8	4.2	4.1
Preparedness for conflict using			
a. Nuclear weapons	2.0	2.2	2.3
b. Biological agents	1.8	2.1	2.1
c. Chemical agents	2.6	2.9	3.0
d. Conventional weapons	3.2	3.5	3.6
Comparison of job performance	2.4	2.5	2.1
Last SQT score	2.6	2.7	2.9
Most recent SQT score	2.8	2.9	---
Most recent ER/EER evaluation	---	2.8	---
Most recent OER evaluation	---	---	2.8
Position in senior rater mass	---	---	3.0
Articles 15 in past two years	1.7	1.6	1.5
FLAG actions in past two years	1.6	1.5	1.4
Letters of Appreciation, etc., past two years	1.6	1.4	1.4
Certificates of Appreciation, etc., past two years	1.7	1.5	1.4
Number of military awards/decorations	2.0	1.9	2.0
<u>Other Measures</u>			
Unit Commander Rating	19.1	19.1	20.3
Promotion Rate	17.7	16.1	15.0
SUM	100.0	100.0	100.0

Intraclass correlations among the judges were run across the weights. (These correlations essentially measure the reliability of the mean weights obtained from averaging across judges the weights assigned the separate readiness measures.³) One-rater and n-rater reliabilities were computed through use of the Spearman Brown formula.

Table 2 shows the results obtained for the weights assigned the E2-4, NCO, and officer readiness measures, respectively. The very high n-rater reliabilities (averaging .995) obtained indicate that the means of the weights assigned the various readiness items by the judges were quite stable. That the sets of mean weights would likely be highly similar across different groups of judges can be seen in Table 3 which presents the correlations between the weights assigned by officers and by NCOs. The table also presents the correlation between the weights assigned by combat, combat support, and combat service support judges and by USAREUR judges and Fort Carson judges. These correlations averaged .986.

Table 2

Reliabilities of Sets of Mean Weights Assigned by the Judges

Type of Soldier	No. of Judges	No. of Items	1-rater Reliability	n-rater Reliability
E2-4	69	24	.783	.996
NCO	70	29	.754	.995
Officer	69	29	.718	.994

Table 3

Correlations Between Sets of Mean Weights Assigned by Different Groups of Judges (n = number of items or scales)

	Type of Soldier		
	E2 - E4 (n = 24)	NCO (n = 29)	Officer (n = 29)
NCO and Officers	.988	.975	.967
Combat and Support	.997	.996	.988
USAREUR and Fort Carson	.982	.992	.990

³ See Winer, B.J. (1971). Statistical principles in experimental design (2nd Ed.). McGraw-Hill Publishers; pg. 290.

Of considerable practical importance is whether the same sets of weights could be used in arriving at the total readiness scores for the E2-4, NCO, and officer soldiers in the sample. The intercorrelations among the weights assigned the three types of soldiers were computed across the 23 common items. These three correlations ranged from .983 to .997, averaging .990. An intraclass analysis was run on the three sets of mean weights of the common items. (Here the number of "judges" is 3, and the number of items is 23.) The 1-rater reliability that resulted was .988 and the 3-rater reliability was .996.

These results essentially meant that we could justify psychometrically the use of the same set of readiness weights for all participants when forming composites by obtaining weighted averages across the various readiness items, scales, and indexes available for each type of soldier. This was considered a fortuitous result, because applying a different set of weights for officers, NCOs, and E2-4s and/or combat and support troops would have meant that the resultant readiness scores would not be rigorously comparable across sampled groups.

Analysis

Overview of the Analysis

The main goal of the analysis was to develop a composite measure of individual readiness that would provide comparable scores for all soldiers in the sample. That is, we wanted to develop a set of scores that allowed comparison of individual readiness across as many of the sampled soldiers as possible. We also wanted the composite readiness measure to be highly reliable and to include the separate measures of readiness that the weighting workshop participants felt should receive the highest weights in an overall composite.

Preliminary analyses of the readiness measures based on an initial subset of the data indicated that the most reliable composite that could be obtained would consist of the supervisor ratings of individual readiness. The analyses also indicated that because of the relatively low correlations of the supervisor ratings with other readiness measures and the relatively high intercorrelations among the rating scales, adding other measures to the composite would most likely lower the reliability of the composite. Preliminary analyses of the data further indicated that sizeable numbers of cases in the full sample would probably be missing one or more of the measures.

Based on these early findings, the decision was made to concentrate the initial analyses of the full data set on the supervisor readiness ratings. These ratings, taken as a group, had been given the highest weight by the readiness weighting workshop participants for forming an overall readiness composite. However, the condition of the full soldier data file when first received presented a number of complications for the use of the supervisor readiness ratings as the core elements in a measure of readiness that would be comparable across all sampled soldiers. To begin with, about 12.5% of the soldiers lacked any supervisor ratings. Of the 9,659 soldiers for whom at least one data element from the individual readiness rating form (IRR) had been recorded on the data base, about 6.7% had no usable designation of whether the soldier had been rated by a first- or second-line supervisor. About 38.0% of the cases had first-line supervisor ratings with the status of the other rater, if any, unknown. Similarly, about 19.2% of the cases had second-line supervisor ratings with the status of the other rater, if any, unknown. Only about 36.2% of the soldiers had ratings that were clearly designated as having come from both their first- and second-line supervisors. Table 4 presents the number of sampled soldiers having supervisor ratings in each of these data completeness categories. As we anticipated that there might be systematic differences between the ratings given by first- and second-line supervisors, we felt that some procedure aimed at trying to establish the status of all raters would be required.

Another problem with the IRR data was that some supervisors had handed in rating forms but had failed to rate the soldiers on one or more of the readiness scales. About 1.1% of the 9,659 soldiers for whom there were any data taken from the readiness rating form actually had no ratings at all, while 21.5% of the remaining soldiers were missing one or more ratings from their data set.

Table 4

Number of Sampled Soldiers Having Supervisor Ratings

	Number
Soldiers on Soldier Data File	11,035
Soldiers with at least one IRR data element	9,659
Soldiers clearly having 1st- and 2nd-line supervisor ratings	3,492
Soldiers clearly having 1st-line supervisor ratings	1,666
Soldiers clearly having 2nd-line supervisor ratings	1,854
Soldiers with unclear or unknown status of supervisor(s)	647

The missing data problems complicated the task of developing a comparable measure of individual readiness for all soldiers. A series of analyses were conducted designed to compensate for the missing information. The analyses initially concentrated on the impact on total individual rating readiness scores of having one or more of the separate readiness scales missing. The initial analyses also concentrated on determining the probable supervisory status of the raters for whom it was unclear whether they were first- or second-line supervisors. For this analysis, data from the soldiers for whom there was complete information from both first- and second-line supervisors were used to estimate the supervisory status of raters with incomplete information.

The next series of analyses used data from soldiers with complete sets of ratings from both first- and second-line supervisors. Issues explored were:

1. Whether the factorial structure of the ratings was apparently the same across the first- and second-line supervisors and across soldiers of different rank -- E2-E4 enlisted personnel, NCOs, and officers.
2. Should the weights obtained in the readiness weighting workshops be applied to the separate scales in deriving a composite overall score or should the simple arithmetic sum or average of the scales be used?
3. What were the reliabilities of the first- and second-line supervisor readiness ratings and how did they compare to the reliability of ratings that were the average of the two supervisor ratings?
4. How interchangeable were first- and second-line supervisory ratings? In the absence of one set of ratings should we impute the other or should we impute the average of the two ratings?

Once the above issues were resolved, and as many soldiers as possible in the sample had been assigned individual readiness scores based on the supervisor ratings, the analyses were directed at the question of the relationship between the supervisor ratings and other measures of readiness and performance in the soldier data base. The factorial structure of the

measures was explored and the feasibility of augmenting the supervisor ratings with other measures to form a more comprehensive overall measure of individual readiness was determined.

In some of the analyses, sampling weights that had been derived for the soldiers having individual readiness ratings were applied. (See Report on Survey Implementation (0005AJ) (1990) for a description of the survey sampling procedure.) These weights were applied when the interests of the analyses went beyond the particular sample of soldiers obtained to the soldier population. When the analyses were primarily focussed on the AFRP sample of soldiers, itself, the sampling weights were not applied. For example, the weights were applied in analyses of the factorial structure of the readiness measures; weights were not applied in analyses aimed at imputing⁴ missing readiness information. Analyses in which sampling weights (the Soldier IRR weights) were used are identified in the text.

With the exception of comparisons among soldiers by grade or rank (E2-4 enlisted personnel, NCOs, warrant officers (WO), and officers), no group comparisons are presented in this report. As individual readiness may be a function of many other variables, e.g., aptitude and education level, besides membership in such groups as married/not married or having children/having no children, such group comparisons will be made in the future using multivariate analyses which can adequately control for differences in related variables which may impact or partially explain differences in readiness across various groups.

Using Composites in which Some Scale Values are Missing

As one or more readiness scale values were missing for approximately 2,050 soldiers in the sample (not including soldiers with no rating data at all), an analysis was run to determine whether to use the average of nonmissing scale values when one or more scales were missing. Specifically, the analysis addressed the impact of successively increasing the number of scales for which data were missing on the correlation between an average based on a reduced set of scale values and an average based on the complete set of scale values.

The scale values from the 4,491 soldiers who had complete rating data from both supervisors for the first eight readiness scales were used in this simulation exercise. The two supervisor ratings for each scale were averaged. The average of the eight readiness scales was obtained next. Then one scale was dropped or assumed missing from each soldier's data set (each of the eight scales was dropped from 1/8th of the sample on a random basis) and the average of the seven rating scales was obtained. Then one of the remaining seven scales was dropped from each of the eight groups' data. The scale dropped from any one group's data was selected randomly under the restriction that once a given scale had been dropped from one group's data it could not be dropped from another group's data that go around. The average of the six

⁴ In general, the authors avoid imputing values for variables that will be used as dependent variables in other analyses. However, in this case, because of the large amount of missing data, we felt it necessary to allow the imputation of values when essentially we were using the available parts of a composite dependent variable to impute the whole composite.

rating scales was then obtained. This process continued until average scale values based on 5, 4, 3, and 2 scales, respectively, were obtained.

The correlations of the averages based upon reduced numbers of scales with the average based on all eight scales were then computed. As would be expected, the correlations dropped as the number of missing scale values increased. But the drop in the correlation was quite slow at first and was still quite high (about .95) when the average readiness score was based on only three scales:

	<u>Number of Scales in Average</u>					
	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>
Correlation with 8-scale average	.995	.988	.980	.968	.948	.905

On the basis of these results, we decided to obtain average readiness rating scale scores for any cases that had values for four or more of the eight readiness scales.

Determining Rater Supervisory Status

As mentioned earlier, it was unclear in many cases whether the rater of the sampled soldier was a first-line or second-line supervisor. Since planned further analyses depended in part on whether the rater should be considered a first-line or second-line supervisor, it was decided to attempt to assign first line/second line supervisory status to those raters for whom such status was in doubt. A two-stage process was used. First, equations were developed to estimate the supervisor status of the raters. Then, for those soldiers having two raters, the estimated supervisor status was subjected to a series of logic tests. The procedures employed are described in more detail below.

Before attempting to assign supervisory status to any rater, a check was made to determine whether the rater had assigned ratings to the ratee on fewer than four of the first eight scales. These rater/ratee combinations were dropped from further analyses. Also dropped were rater/ratee combinations where the rater reported on the rating form that he/she was not a supervisor and was not very familiar with the ratee.

Using data from the 3,399 remaining soldiers having both first- and second-line supervisor ratings, multiple regression equations were computed that estimated rater status from the rater's rank and familiarity with the ratee. The equations were derived separately for each enlisted rank and each officer grade level and for all warrant officers as a combined group (because of the small warrant officer sample size). These equations were then used to estimate whether raters for whom supervisory status was unclear were first- or second-level supervisors.

The overall accuracy of the regression equations in correctly predicting supervisor status was 65% for E2-E4 enlisted personnel, 76% for NCOs, 75% for warrant officers, and 83% for officers. As these percentages were not very high, logic checks were made for those ratees having two sets of ratings and for whom one or both supervisors' status had been imputed. If one of the two raters was assigned the status of first-line supervisor and the other the status of second-line supervisor, then the status assignments were allowed to

stand. If, however, the two raters had been assigned the same status, then the rater with the lower rank was assigned the status of first-line supervisor and the rater of higher rank the status of second-line supervisor. If the raters were of equal rank, then the rater reporting the higher level of familiarity with the ratee was assigned the status of first-line supervisor. If the raters' were tied in both rank and degree of familiarity, then their two sets of ratings for the given ratee were averaged and were considered to have come from one rater.

Table 5 shows the number of soldiers by grade or rank for whom only first-line supervisor, only second-line supervisor, and both first- and second-line supervisor data were available at the conclusion of the rater designation process. Soldiers having ratings from any one supervisor on fewer than four scales are omitted from the table. It can be seen that of the original 9,659 soldiers listed on the IRR data file, about 98% had usable data according to the criteria adopted.

Table 5

Availability of Supervisor Readiness Rating Data

Groups	Usable Supervisor Ratings			Total
	1st Line Only	2nd Line Only	Both 1st & 2nd	
E2-4	1,149	723	2,393	4,265
NCO	671	352	1,594	2,617
WO	47	22	115	184
Officers	1,035	328	1,036	2,399
Total	2,902	1,425	5,138	9,465

Factorial Structure of the Ratings

In order to determine whether the readiness scales could be considered to be measuring the same basic underlying construct, principal component factor analyses were performed on the eight scales that were completed for all soldiers. The factor analyses were conducted separately for the first-line supervisors, the second-line supervisors, and for the average of the first- and second-line supervisors ratings. The analyses were conducted on the ratings received by the 4,491 soldiers in the sample who had complete sets of ratings on the eight scales from both supervisors. The soldier IRR sampling weights were applied in the computations.

In all three factor analyses, only one factor met the 1.0 eigenvalue minimum value criterion that was used for factor extraction. Table 6 presents the factor loadings obtained in the three analyses. The factor loadings obtained for the scales were fairly similar across the analyses. In

all three analysis, the Effort and Initiative and the Job Discipline scales had the highest loadings, while the Individual Deployability (Personal/Family) and the Job Technical Knowledge/Skills scales had the lowest loadings.

Table 6

Factor Loadings Obtained for Eight Readiness Scales
(n = 4,491 soldiers, all ranks)

Scale	Rating Source		
	1st Line Supervisor	2nd Line Supervisor	Avg. 1st & 2nd Supervisors
Cooperation/Team Work/Esprit de Corps	.828	.828	.864
Effort and Initiative	.857	.851	.883
General Soldiering Skills	.756	.751	.795
Individual Deployability (Army Task/Mission)	.705	.712	.752
Individual Deployability (Personal/Family)	.595	.570	.603
Job Discipline	.868	.857	.896
Job Technical Knowledge/Skills	.523	.667	.684
Performance under Pressure and Adverse Conditions	.818	.814	.854

The principal components factor analyses were also run on the 12 scales that were completed for NCOs and officers. The analyses were run separately on the ratings obtained from the first-line supervisors, the second-line supervisors, and the average of the first- and second-line supervisors for the 1,795 soldiers⁵ who had complete sets of ratings from both supervisors. The soldier IRR sampling weights were applied in the computations.

Again, in all three analyses, only one factor met the 1.0 eigenvalue criterion. Table 7 presents the factor loadings obtained in the analyses. The factor loadings obtained for the scales were again fairly similar across rater types. In all three analyses, the four scales having the highest loadings on the single factor extracted were Leadership of Subordinates, Effort and Initiative, Job Discipline, and Maintaining Training Status of Subordinates, while the Individual Deployability (Personal/Family), Job Technical Knowledge/Skills, and Individual Deployability (Army Task/Mission) scales had the lowest loadings.

The similarity of the factor analytic results for the first- and second-line supervisors suggests that the scales are measuring the same construct for both types of raters. The similarity of the results obtained with the eight scales

⁵ These 1,795 soldiers are a subset of the 4,491 soldiers who had complete data for the first eight scales.

and with the twelve scales, suggests that a measure of individual readiness based on the 12 scales would essentially be measuring the same underlying construct as a measure based on the eight scales.

It is interesting to note that the factor loadings obtained for the average of the first- and second-line supervisors were consistently higher (with but one exception) across all scales in both sets of analyses than the factor loadings obtained for the separate ratings made by the first- and second-line supervisors. Though the differences between the loadings are marginal, the higher loadings suggest that the averages of the two supervisor ratings can provide better measures of the underlying construct than either supervisor's ratings alone. (As seen on page 19, the Alpha reliabilities of composites derived from averaging the first- and second-line supervisor ratings were higher than the reliabilities of composites derived from either the first- or second-line supervisor ratings alone.)

Table 7

Factor Loadings Obtained for Twelve Readiness Scales
(n = 1,795 NCOs and Officers)

Scale	Rating Source		
	1st Line Supervisor	2nd Line Supervisor	Avg. 1st & 2nd Supervisors
Cooperation/Team Work/Esprit de Corps	.828	.805	.855
Effort and Initiative	.858	.846	.886
General Soldiering Skills	.757	.700	.761
Individual Deployability (Army Task/Mission)	.650	.698	.710
Individual Deployability (Personal/Family)	.565	.555	.575
Job Discipline	.850	.849	.880
Job Technical Knowledge/Skills	.470	.683	.677
Performance under Pressure and Adverse Conditions	.816	.804	.848
Care and Concern for Subordinates	.818	.821	.858
Care and Concern for Subordinates' Families	.748	.778	.792
Leadership of Subordinates	.881	.874	.914
Maintaining Training Status of Subordinates	.852	.844	.880

As the Individual Deployability (Personal/Family) scale in general had the lowest factor loading on the one common factor obtained in the six factor analyses, consideration was given to dropping this scale from composite measures consisting of the sum or average of the scales. The low loadings suggested that the scale would marginally (if not negatively) contribute to the reliability of composites based on the other scales. But more

importantly, the scale's presence in an individual readiness composite could be interpreted as biasing the measure toward one that would be more related to family factors. Though this scale had its origins in the critical readiness incidents provided by experienced Army NCOs and officers and would, with little doubt, measure an aspect of individual readiness, it was decided to drop the scale from the readiness composite in the interest of avoiding future controversy.

Choosing between Weighted and Unweighted Composites Readiness Scores

Analyses were performed to help determine whether the weights obtained in the readiness weighting workshops should be applied to the separate readiness scales in arriving at the composite readiness scores or whether simple arithmetic averages of the scales should be used. Two types of statistics were obtained. First, the correlations between the average readiness scores were obtained using both weighted and unweighted scales. These correlations were derived separately for the E2-4 personnel, NCOs, warrant officers, and officers for the weighted and unweighted composites obtained from the first-line supervisors, the second-line supervisors, and the average of the first- and second-line supervisors (only cases having complete sets of ratings were used). These correlations were extremely high, ranging from .9993 to .9998. (Very high correlations between weighted and unweighted scores are frequently obtained when the component items or scales are fairly highly intercorrelated and the weights are not extremely different--see Footnote 2, page 5.)

A second analysis compared the Alpha reliabilities⁶ of composites consisting of the weighted sum of the separate scale scores and composites formed through the simple summation of the unweighted scale scores. The Alpha coefficients were derived separately for the composites obtained for E2-4 personnel, NCOs, warrant officers, and officers for the first-line supervisors, the second-line supervisors, and the average of the first- and second-line supervisors. The Soldier-IRR sampling weights were applied in calculating the Alpha coefficients.

Table 8 shows the obtained Alpha reliabilities broken down by group and rater type for the weighted and unweighted composites. Inspection of the table shows that the unweighted composites were slightly but consistently more reliable than the comparable weighted composites. As the correlations between the weighted and unweighted composites were extremely high (above .999) and the reliabilities slightly favored the unweighted composites, it was decided to use the unweighted composites (or their equivalent average scale values) in further analyses of the individual readiness rating data. The unweighted composites have the further advantage of being easier to obtain in a field setting. Moreover, not using the weights avoids future questions concerning the derivation and application of the weights themselves.

⁶ An Alpha reliability is an internal-consistency measure of reliability which is essentially based on the ratio of the sum of the variance of component scores to the variance of a total score based on the sum of the component scores.

Table 8

Alpha Reliabilities of Unweighted and Weighted Composites

Group	<u>First-Line Rater</u>		<u>Second-Line Rater</u>		<u>Average of Both Raters</u>	
	UnWted	Wted	UnWted	Wted	UnWted	Wted
E2-4	.898	.896	.908	.907	.923	.920
NCO	.948	.945	.950	.948	.960	.958
WO	.918	.915	.932	.930	.936	.933
Officers	.919	.915	.930	.926	.937	.933

Choosing Between First- and Second-Line Raters or Their Average

As noted earlier, a large number of the sampled soldiers were only rated by one supervisor. In fact, less than 55% of the 9,465 soldiers with usable rating data were rated by both the first- and second-line raters. In view of the extent of the missing data, an issue that obviously needed to be addressed was whether to use the first- and second-line raters' data interchangeably when the data from one rater were missing. Supporting the use of simple substitution of one rater's values for the other were the results of the factor analyses described earlier. The factor loadings of the rating scales were highly similar across both raters for E2-4 personnel, NCOs, and officers (see Tables 6 and 7). The Alpha reliabilities of their composites were similarly high, averaging about .92 for the first-line supervisor ratings and .93 for the second-line supervisor ratings.

However, the mean ratings given the first- and second-line supervisors differed somewhat. Table 9 presents the mean ratings given the E2-4 enlisted personnel, NCOs, warrant officers, and officers. These means were calculated applying the Soldier IRR weights. A repeated measure analysis of variance using the general linear model procedure with sampling weights was run to test the significance of the mean differences. The rater type means were not significantly different, but both the group mean differences and the interaction group x rater type term were significant at the .0001 level. That the group means were highly significantly different is not unexpected--one would expect higher ranked personnel to be given higher readiness ratings on the average than lower ranked personnel. The significant interaction term indicates that the amount of the difference in mean ratings between the first- and second-line supervisors varied across the four groups. For the E2-4 and officers, the second-line supervisor average ratings were higher than the first-line supervisor average ratings; for the NCOs and warrant officers, the first-line supervisor average ratings were higher than those of second-line supervisors. This finding suggested that simply using the two raters' data interchangeably could introduce systematic bias in the resultant individual readiness scores depending upon the group the soldier was in and whether first-line supervisor ratings were being substituted for second-line supervisor ratings or vice versa.

Table 9

Means of First- and Second-Line Supervisor Ratings

Group	1st Line	2nd Line	Average
E2-4	5.118	5.183	5.150
NCO	5.802	5.702	5.752
Warrant Officers	6.082	5.932	6.007
Officer	<u>6.153</u>	<u>6.195</u>	<u>6.174</u>
Total Sample	5.501	5.514	5.508

Moreover, the correlations between the average of the seven or eleven ratings given by the first-line supervisors and the average of the comparable ratings given by the second-line supervisors were disappointingly low. Table 10 gives these correlations for E2-4 enlisted personnel, NCOs, warrant officers, and officers separately. (The correlations were computed using only the cases for whom there were complete data. The Soldier-IRR sampling weights were applied.) The correlation between the two average ratings ranged from .35 for warrant officers to .52 for E2-4 and were far too low to justify using the first- and second-line supervisor ratings essentially as parallel scores, substituting one for the other.

Table 10

Correlations Between First- and Second-Line Supervisor Ratings

Group	n	1st Line with 2nd Line	1st Line with Average Both Raters	2nd Line with Average Both Raters
E2-4	2,118	.52	.87	.87
NCO	1,041	.48	.86	.86
Warrant Officers	72	.35	.82	.82
Officers	700	.45	.86	.84

The decision was made therefore to use the average of the first- and second-line supervisors' ratings as the primary basis of the individual readiness scores. The factor loadings of the rating scales when rater averages were used were generally higher than comparable loadings for the first-line and second-line ratings factor analyzed separately (see Tables 5 and 6). The Alpha reliabilities of the composites formed by averaging the two supervisor ratings were consistently higher than the reliabilities obtained

for either the first-or second-line raters (see Table 9). These Alpha reliabilities were .923 for the E2-4 personnel (7 scales) and averaged .944 for the NCOs, warrant officers, and officers (11 scales).

The correlations between the average of the first-line supervisor ratings and the average of the first- and second-line supervisor ratings were quite high, averaging about .85 across the four groups. The correlations between the average of the second-line supervisor ratings with the average of first- and second-line supervisor were equally high (see Table 10). These high correlations, as well as the factorial and reliability results mentioned above, led to the selection of the average of the two supervisor's ratings as the individual readiness measure of choice.

Imputation of Soldier Readiness Scores

Multiple regression equations were used to estimate or impute the average of the first- and second-line supervisors' readiness ratings for those sampled soldiers for whom there was only one rater. The equations were derived separately for the sampled E2-4 personnel, NCOs, warrant officers, and officers. The regression equations were derived using data from the soldiers for whom there were two complete sets of ratings on the scales. Separate equations were derived for estimating the average of the first- and second-line supervisors' readiness ratings when the first-line supervisor ratings were missing and when the second-line supervisor ratings were missing. The independent variables used in the equations to estimate the average ratings when the second-line supervisor ratings were missing were first-line supervisor ratings (average of relevant scales), first-line supervisor's rank, and ratee rank. When the first-line supervisor ratings were missing, the independent variables were second-line supervisor ratings (average of relevant scales), second line supervisor's rank, and ratee rank. The dependent variable in both cases was the average of the first- and second-line supervisors ratings taken across the relevant scales.

A multiple regression approach for accomplishing the imputation of the average rating was chosen in lieu of a "hot deck" procedure because it was anticipated that the part/whole relationship between the principal independent variable (the supervisor ratings that were available) and the average of the supervisor's ratings would produce sizeable multiple correlation coefficients (R). In fact, the multiple correlation obtained for the four groups (E2-4, NCOs, warrant officers, and officers) ranged from .814 to .875 (see Table 11).

After the equations were used to estimate or impute first- and second-line Average Supervisor Ratings for the sampled soldiers that only had ratings from one supervisor, a dummy variable was created which indicated whether the soldier had an imputed value or an actual value for his/her individual readiness score. This variable can be used to control for imputation process effects if subsequent research indicates that is necessary.

Table 11

Statistics for Equations Used to Impute Average of First- and Second-Line Supervisor Readiness Scores

Group	No.	First-Line Supervisor Data Available			Second-Line Supervisor Data Available		
		R ²	R	Mean Sq Error	R ²	R	Mean Sq. Error
E2-4	2118	.7649	.875	.2420	.7645	.874	.2425
NCO	1041	.7512	.867	.2028	.7476	.864	.2065
WO	72	.6623	.814	.1534	.6947	.833	.1387
Officer	700	.7624	.873	.1093	.7145	.845	.1313

Relationships Between Supervisor Ratings and Other Performance/Readiness Measures

The correlations between Average Supervisor Rating and other performance/readiness measures collected in the AFRP survey are shown in Table 12 for each of the four groups and for the total sample. The sample Soldier-IRR weights were used in calculating these correlations. The number of cases whose data were used in the computations varies considerably both across the measures and between the groups because of missing data and because some of the measures were not applicable to two or more groups. The measures with the most missing data (5% or more) are listed in Table 13.

It can be seen through examination of both Table 12 and Table 13 that the readiness/performance measures that are related more highly to Average Supervisor Rating generally have higher amounts of missing data. This is especially true of the measures that are based on supervisor ratings. This result is unfortunate since these other ratings would be likely candidates to add to the Average Supervisor Rating in order to increase the comprehensiveness of the AFRP basic measure of individual readiness without unduly lowering the reliability of such a composite measure.⁷ But it would be difficult to maintain comparability of total readiness scores across all the sampled soldiers if the added measures were missing or not applicable to large percentages of the soldiers.

The correlations of Average Supervisor Rating with the nonsupervisory measures were generally fairly low, but in the expected direction. For example, Articles 15 and FLAG actions had negative correlations with Average Supervisor Rating that ranged from -.04 to -.21 across the four groups. Last Physical Readiness Test score, Most recent SQT score, Letters of appreciation,

⁷ In general, the higher the intercorrelations among component variables, the higher the Alpha reliability, other factors, e.g., variable weights and variance, being equal.

Table 12

Correlations of Average Supervisor Rating with Performance Variables
by Grade Level

Variable*		E2-4	NCO	WO	Officers	Total Group
S38T**	No. of types of activities took time off for	-.08	-.06	-.01	.05	-.04
S41	Prepared to perform wartime job tasks	.11	.10	.15	.13	.16
S42A	Task preparedness -- nuclear weapons	.02	.00	.09	.07	-.05
S42B	Task preparedness -- biological agents	.00	-.02	.00	.02	-.03
S42C	Task preparedness -- chemical agents	.01	-.01	.06	.04	-.01
S42D	Task preparedness -- conventional weapons	.05	.06	.07	.12	.07
S43	Pay grade job performance comparison	.19	.19	.17	.17	.23
S44	Last Physical Readiness Test Score	.09	.10	-.01	.12	.13
S46	Most recent SQT score	.19	.18	N/A	N/A	.24
S47	Most recent ER/EER evaluation	N/A	.36	N/A	N/A	.36
S49	Most recent OER evaluation	N/A	N/A	.40	.39	.38
S50	Last rating above/below center mass	N/A	N/A	.15	.16	.15
S51	Articles 15 received past two years	-.15	-.10	-.04	-.21	-.21
S52	FLAG Actions received past two years	-.06	-.12	-.08	-.17	-.15
S54	Letters of Appreciation, etc., past two years	.05	.06	.06	.08	.07
S55	Certificates of Appreciation past two years	.07	.02	-.09	.05	.01
S56	Awards and decorations received while in military	.09	.16	.04	.19	.26
CMD RATE	Commander assessment of job performance	.35	.43	.51	.46	.45

* The variable, Promotion rate, was unavailable at the time these analyses were run.

** Variable was transformed to number of different activities for which the soldier took time off duty last month.

Table 13

Percent of Cases Having Missing Data on Selected Performance/Readiness Measures

Variable		E2-4 (n=4265)	NCO (n=2617)	WO (n=184)	Officers (n=2399)	Total (n=9465)
S44	Last Physical Readiness Test Score	26	13	17	15	19
S46	Most recent SQT score	32	13	--	--	25*
S47	Most recent ER/EER evaluation	--	40	--	--	40*
S49	Most recent OER evaluation	--	--	11	6	7*
S50	Last rating above/below center mass.	--	--	20	22	22*
CMD RATE	Commander assessment of job performance	32	32	27	55	38

* Percent based on total number of cases for whom the measure is applicable.

and Awards/decorations had small positive correlations with Average Supervisor Rating. It is interesting to note that the self-ratings of preparedness to carry out assigned tasks in a war in which the enemy used nonconventional weapons (S42A, B, C) generally had no relationship with Average Supervisor Rating. However, self-ratings of preparedness to perform wartime tasks in a presumed more conventional warfare setting (S41 and S42D) generally had low positive correlations with Average Supervisor Rating.

In order to determine whether some of the performance/readiness measures could be considered measures of the same underlying construct, separate principal components factor analyses of the intercorrelation matrices of the measures were conducted for each of three grade groups (E2-4, NCO, and officers). In the analyses, factors with eigenvalues greater or equal to 1.0 were rotated using the varimax routine. Soldier-IRR weights were applied in the calculation of the correlation matrices. The rotated factor patterns are shown in Tables 14A, B, and C.

Examination of the factor loadings obtained in the analyses indicated that four groups of variables loaded heavily on four factors in each analysis. In each of the three analyses, Soldier's Questionnaire items 42A, B, and C, which are measures of the soldier's self-ratings of their preparedness to fight in a war in which the enemy uses nonconventional weapons, loaded fairly heavily (at or above .40) on one factor. Similarly, in each analysis, items 41 and 42D, which are apparently measures of soldier self-ratings of preparedness to fight in a conventional war, loaded fairly heavily on a factor. Also in all three analyses, items S54 and S55 had fairly high loadings on a factor that apparently is measuring tendency to receive letters and certificates of appreciation and commendation.

Table 14A

Rotated Factor Pattern for Performance/Readiness Measures
(n = 1,403 E2-4 soldiers)

Variable		Factor					
		I	II	III	IV	V	VI
S38T	No. of types of activities took time off for	03*	01	-16	03	-11	12
S41	Preparedness for wartime job	26	06	02	02	70	14
S42A	Task preparedness -- nuclear weapons	69	-02	04	07	07	12
S42B	Task preparedness -- biological agents	95	02	01	00	08	01
S42C	Task preparedness -- chemical agents	91	-01	-02	-04	14	03
S42D	Task preparedness -- conventional weapons	43	06	01	-02	43	04
S43	Pay grade job performance comparison	-01	08	21	02	27	26
S44	Last Physical Readiness Test Score	04	08	00	-08	01	32
S46	Most recent SQT score	01	02	16	00	15	34
S51	No. of Articles 15 received past two years	-01	05	-28	40	02	05
S52	No. of FLAG Actions received past two years	04	-02	-04	80	-01	-11
S54	No. of letters appreciation past two years	-02	65	-21	-01	04	10
S55	No. of certificates appreciation past two years	01	75	03	01	05	12
S56	No. of awards/decorations while in military	07	25	07	08	03	30
CMD RATE	Commander assessment of job performance	01	04	51	-09	02	08
AVG IRR	Average Supervisor Ratings	04	00	64	-06	02	19

* Decimal points omitted.

Table 14B

Rotated Factor Pattern for Performance/Readiness Measures
(n = 763 NCOs)

Variable		Factor					
		I	II	III	IV	V	VI
S38T	No. of types of activities took time off for	-02*	00	03	-04	06	69
S41	Prepared to perform wartime job tasks	27	07	07	48	-07	-09
S42A	Task preparedness -- nuclear weapons	74	05	03	13	-03	-02
S42B	Task preparedness -- biological agents	92	-03	08	14	-01	-01
S42C	Task preparedness -- chemical agents	88	-03	05	24	04	-01
S42D	Task preparedness -- conventional weapons	37	03	01	66	02	-08
S43	Pay grade job performance comparison	08	32	10	22	-22	-08
S44	Last Physical Readiness Test Score	-03	15	20	-13	-19	-05
S46	Most recent SQT score	-04	33	-03	36	-01	08
S47	Most recent ER/EER evaluation	03	52	03	18	-34	04
S51	No. of Articles 15 received past two years	02	-17	05	-08	33	-02
S52	No. of FLAG Actions received past two years	-03	-06	-05	01	60	07
S54	No. of letters appreciation past two years	08	07	82	12	03	04
S55	No. of certificates appreciation past two years	06	01	75	09	-03	01
S56	No. of awards/decorations while in military	07	12	10	24	-04	02
CMD RATE	Commander assessment of job performance	01	63	06	-02	-17	-03
AVG IRR	Average Supervisor Ratings	-02	67	03	12	-02	00

* Decimal points omitted.

Table 14C

Rotated Factor Pattern for Performance/Readiness Measures
(n = 707 officers)

Variable**		Factor					
		I	II	III	IV	V	VI
S38T	No. of types of activities took time off for	02*	-04	06	00	-03	64
S41	Prepared to perform wartime job tasks	18	07	06	10	58	-05
S42A	Task preparedness -- nuclear weapons	80	00	03	03	19	06
S42B	Task preparedness -- biological agents	90	-03	06	01	08	-02
S42C	Task preparedness -- chemical agents	92	00	00	00	18	-02
S42D	Task preparedness -- conventional weapons	34	03	-01	03	70	09
S43	Pay grade job performance comparison	01	30	06	09	22	-11
S44	Last Physical Readiness Test Score	-01	00	10	20	20	-10
S49	Most recent OER evaluation	-03	65	05	35	05	07
S50	Last rating above/below center mass	00	82	03	11	-04	-02
S54	No. of letters appreciation past two years	01	10	83	-01	-03	04
S55	No. of certificates appreciation past two years	09	-01	57	07	08	00
S56	No. of awards/decorations while in military	-08	05	19	13	13	07
CMD RATE	Commander assessment of job performance	00	22	02	55	08	-03
AVG IRR	Average Supervisor Ratings	05	18	08	72	07	05

* Decimal points omitted.

** The disciplinary measures, S51 and S52 were omitted from this analysis owing to their lack of variance in the subset of officers having complete data on the remaining variables.

The measure of primary interest in this analysis, Average Supervisor Rating, also helped define a factor in each of the analysis. In the analysis of the E2-4 data, the average rating measure and the Commander's assessment of job performance (CMD RATE) loaded heavily on one factor. In the NCO sample, one of the factors had high loadings on Average Supervisor Rating, CMD RATE, and the NCO's EER. In the officer sample, Average Supervisor Rating and CMD RATE had fairly high loadings on one factor on which the OER rating also had a moderate loading (.35). These results indicate that, in general, the average rating measure loaded on the same factor as did other supervisory rating measures. Unfortunately, as discussed earlier, these other rating measures were not applicable to some soldiers and/or had high proportions of soldiers with missing data in our sample.

Reliabilities of Alternate Readiness Composites

The Alpha reliabilities for a composite composed of all the readiness measures, including the Average Supervisor Rating, were obtained for E2-4 personnel, NCO's, and officers separately and combined. The component scores were converted to standard or z-scores prior to obtaining the reliabilities. The IRR-Soldier sampling weights were applied in the computations. Table 15 presents the reliabilities for when the component scores were unweighted in deriving a total readiness score and when they were weighted by the readiness workshop weights. The reliabilities were quite low. Applying the readiness workshop weights to the component measures lowered the reliabilities even further. These results, when considered in conjunction with the factor analysis results and the missing data problems, led to the decision to recommend the use of the Average Supervisor Rating, by itself, as the primary AFRP measure of individual readiness.

Table 15

Alpha Reliability of Readiness Composites Using All Available Component Measures

	E2-4	NCO	Officers	All Cases
Unweighted Composite	.623	.699	.665	.672
Weighted Composite	.414	.471	.512	.454

This is not to say that AFRP researchers should not determine the relationship of family factors and related phenomena to other available performance/readiness measures. Alpha reliabilities were obtained for four composites that were suggested by the results of the factor analyses. These reliabilities were obtained for E2-4 enlisted personnel, NCOs, and officers, separately and combined. The component measures scores were converted to

standard or z-scores prior to obtaining the reliabilities. As can be seen in Table 16, the reliabilities were generally quite low for three of these composites. However, the reliability of the fourth composite, Self-evaluation of preparedness for a nonconventional war, was quite respectable (about .90). This composite, which may reflect soldier confidence to handle nonconventional warfare situations, may be shown in future research to be related importantly to family factors.

Table 16

Alpha Reliabilities of Selected Readiness/Performance Composites

Composite	Component Measures	E2-4	NCO	Officers	All Cases
Self-evaluation of preparedness for nonconventional war	S42 A, B, C	.889	.906	.906	.897
Self-evaluation of preparedness for conventional war	S41, S42D	.573	.611	.669	.604
Disciplinary problems	S51, S52	.499	.336	.225	.487
No. of letters and certificates	S54, S55	.704	.775	.602	.716

Distribution of Average Supervisor Ratings

The percentage distribution of the Average Supervisor Ratings in the soldier population was estimated using the Soldier-IRR weights. As seen in Table 17, the distribution is negatively skewed with over 70% of the weighted cases having scores 5.0 and above. The mean score is approximately 5.5 and the standard deviation approximately 1.0. This distribution, while not ideal, is certainly within the bounds of acceptability, especially when considering the high concentrations of ratings usually found at the upper end of operational performance scales.

Table 17

Estimated Percentage Distribution of Average Supervisor Readiness Ratings

Average Readiness	Percentage
Below 1.99	.1
2.00 - 2.49	.7
2.50 - 2.99	1.4
3.00 - 3.49	2.1
3.50 - 3.99	4.4
4.00 - 4.49	7.3
4.50 - 4.99	11.5
5.00 - 5.49	16.3
5.50 - 5.99	21.8
6.00 - 6.49	20.5
6.50 - 7.00	<u>13.9</u>
	100.0

Conclusion

The results of the analyses conducted to date on the individual readiness measures point to the pitfalls of combining all the measures into one comprehensive overall index of readiness. The measures are tapping different aspects of performance as evidenced by the five or six factors that emerged from the factor analyses of the E2-4, NCO, and officer data. In itself, this result is not too worrisome, but substantial amounts of data are missing for some key measures, e.g., the unit commander ratings. To obtain overall readiness scores that would be comparable across all the sampled soldiers, a fairly extensive imputation procedure would have to be employed. Moreover, such a composite score would have low reliability as measured by the Alpha coefficient.

Instead, the results lead to the conclusion that the supervisor rating scales should be used as the primary AFRP measure of individual readiness. Taken as a set, these scales were assigned the highest weight by the readiness workshop participants. The scales are apparently measuring one underlying factor. That is, there is every reason to believe that readiness scores based on the scales will be comparable across different types of ratees. The reliability of the average ratings are .90 or higher, and the distribution of the rating scores is not overly concentrated at the upper end of the scales. We believe, moreover, that the missing data problem for the ratings, though serious, has been adequately overcome through the part/whole imputation procedure used.

The use of the rating scales in further readiness research should be encouraged. The scales could even be used operationally. To ease the administrative burden, the scales could be reduced in number by one scale (to 10 for NCOs and officers, 6 for E2-4) without unduly lowering the reliability of the average or total score. To further ease the administrative burden, the scales could be given to either the first-line or second-line supervisors to complete, whichever group of raters is more accessible. (We would not recommend, however, using first-line or second-line ratings interchangeably.) The arithmetic average of the ratings would yield essentially the same score as a weighted average, and would be simpler to use. But perhaps most important, the heavy involvement of experienced Army NCOs and officers in the development of the scales, and the high weight given the scales in comparison to many other measures of individual readiness, almost assure that the scales would be acceptable to the Army.

References

Research Triangle Institute, Caliber Associates, and Human Resources Research Organization (August, 1990). AFRP Analysis Plan (0005AK), Volume I. (RTI/3795/05 WP).

Research Triangle Institute, Caliber Associates, and Human Resources Research Organization (May, 1990). Report on Survey Implementation (0005AJ). (RTI/3795/05).

Research Triangle Institute, Caliber Associates, and Human Resources Research Organization (1988). (TR11): Definition and Measures of Individual and Unit Readiness and Family Phenomena Affecting it. (RTI/3795/03-37 WP - Draft).

APPENDIX A

**Performance/Readiness
Soldier Questionnaire Items**

and

Individual Readiness Rating Scales

38. In the last month, how much time did you take off from duty for the following reasons? (Please count time when you were sick, arrived late, or left early, but do NOT include pass or leave time.)

	Does Not Apply	Did Not Take Off Any Time	If Less Than One Day How Many Hours?					If One Day or More How Many Days?			
			1	2	3	4-5	6-7	1	2	3+	
a. Problem with transportation to duty location (for example, car wouldn't start or bus was late)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. My health (for example, sick call or doctor/dentist appointment)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Taking care of child(ren) because regular care was not available	NA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Other care of child(ren) (for example, sick child or visit to school)	NA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. To help spouse (for example, take spouse to doctor appointment)	NA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. To take care of personal or family business (for example, financial matters or housing problems)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Other personal or family reasons		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. If we were to go to war today, how well prepared are you to perform the tasks in your wartime job? (If you aren't sure, give your best estimate.)

- ☐ Very well prepared
☐ Well prepared
☐ Neither well nor poorly prepared
☐ Poorly prepared
☐ Very poorly prepared

42. How well prepared are you to do your assigned tasks in a conflict in which the enemy uses the following weapons? (If you aren't sure, give your best estimate.) (MARK ONE CIRCLE FOR EACH ITEM.)

	Very Well Prepared	Well Prepared	Neither Well Nor Poorly Prepared	Poorly Prepared	Very Poorly Prepared
--	--------------------	---------------	----------------------------------	-----------------	----------------------

- a. Nuclear weapons ☐ ☐ ☐ ☐ ☐
- b. Biological agents ☐ ☐ ☐ ☐ ☐
- c. Chemical agents ☐ ☐ ☐ ☐ ☐
- d. Conventional weapons ☐ ☐ ☐ ☐ ☐

43. Compared to other soldiers in your same pay grade in your unit or place of duty, how would you rate your own job performance?

Much Better Than Most			About Average			Much Worse Than Most
1	2	3	4	5	6	7

44. What was your last Physical Readiness Test Score?

(Scoring range from 0-300.)

☐ Don't know score

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

IF ENLISTED, CONTINUE.
IF OFFICER, SKIP TO QUESTION 49.

45. Have you ever taken a Skill Qualification Test (SQT)?

☒ Not applicable

☐ Yes ☐ No

46. What was your most recent SQT score?

☐ Don't know score

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

IF PAY GRADES E5-E9, CONTINUE.
IF PAY GRADES E1-E4 SKIP TO QUESTION 51.

47. What is the senior rater overall potential box check on your most recent NCO-ER?

1	2	3	4	5
1	2	3	4	5
Successful			Fair	Poor

☒ Does not apply; I have not been rated under the NCO-ER system or I have not yet received a copy of my official rating.

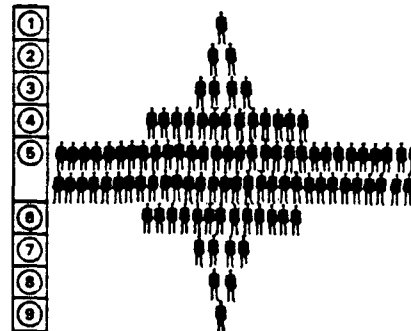
48. If you have not received an evaluation under the NCO-ER system, what is your score on your most recent EER?

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

☒ Does not apply; I have not been rated under the EER system.

SKIP TO QUESTION 51

49. What is the senior rater potential evaluation box check of your most recent OER? (MARK ONE CODE)



☒ Does not apply; I have not been rated.

50. Was your last rating in, above, or below the center of mass for your senior rater?

☐ Above center of mass
☐ In center of mass
☐ Below center of mass
☐ Don't know

51. How many Articles 15 have you received in the past two years? (MARK ONE)

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4 or more

52. How many FLAG Actions (that is, suspension of a favorable personnel action) have you received in the past two years? (MARK ONE)

- ☐ 0
☐ 1
☐ 2
☐ 3
☐ 4 or more

53. Have you ever received a reduction in grade?

- ☐ Does not apply
☐ Yes ☐ No

The next two questions ask about the number of Letters and/or Certificates of Appreciation, Commendation, or Achievement you have received in the past 2 years. DO NOT count letters or certificates received for the following.

- Completion of AIT or officer basic and advanced training
- Completion of any additional training courses
- Completion of Head Start
- Announcement of a promotion
- Announcement of an award or decoration

54. How many Letters of Appreciation, Commendation, or Achievement have you received in the past 2 years? (MARK ONE)

- ☐ 0 ☐ 6
☐ 1 ☐ 7
☐ 2 ☐ 8
☐ 3 ☐ 9
☐ 4 ☐ 10+
☐ 5

55. How many Certificates of Appreciation, Commendation, or Achievement have you received in the past 2 years? (MARK ONE)

- ☐ 0 ☐ 6
☐ 1 ☐ 7
☐ 2 ☐ 8
☐ 3 ☐ 9
☐ 4 ☐ 10+
☐ 5

56. How many awards and decorations have you received during all your time in the military? (Include all badges and medals, and count ones where you have received more than one of the same type.)

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

INDIVIDUAL READINESS RATING SCALES

Instructions

Individual rating scales will be used to assess the readiness of individual soldiers participating in the Army Family Research Program. Twelve areas of individual readiness have been labeled and defined on the following pages. We would like you to use these scales to rate one or more soldiers that have been identified as individuals that you supervise.

Because many soldiers will be asked to rate more than one individual, cards have been provided to facilitate the rating. The names on the card should be the same as the names in the box on page 4 of the individual readiness rating booklet. For each area of soldier readiness, place your card on the form so that the first name on the card lines up with the first row of numbers, and the second name on the card lines up with the second row of numbers, etc. as in the example below:

EXAMPLE

EFFORT AND INITIATIVE

How ready is each soldier to show extra effort and initiative?

Makes little effort to ensure job gets done; gives up easily when faced with difficult problems; reluctantly accepts responsibility; seldom anticipates problems.

Puts in effort and keeps trying when its very important to complete assignments; overcomes most obstacles; accepts responsibility when given it; anticipates potential problems.

Often volunteers to work extra hours pushes hard to overcome all obstacle readily assumes responsibility when necessary; identifies and attends to potential problems.

Names of the soldiers
you are rating.

1. _____	1	2	3	4	5	6	7
2. _____	1	2	3	4	5	6	7
3. _____	1	2	3	4	5	6	7
4. _____	1	2	3	4	5	6	7
5. _____	1	2	3	4	5	6	7
6. _____	1	2	3	4	5	6	7
7. _____	1	2	3	4	5	6	7
8. _____	1	2	3	4	5	6	7

The process for completing the individual readiness scales is:

- Each area of individual readiness will be rated on a 7-point scale.
- Each scale uses statements over the rating scale that provide examples of the kinds of behavior covered by the scale. The statements also describe different levels of readiness.
- Ratings should be based on how ready the individual is in each area most of the time.
- Each area of individual readiness is a relatively independent or separate area. Your ratings should reflect each individual's own readiness levels in each area accurately.

- Each individual should be rated independently from the other individuals in each area.
- Base your ratings only on readiness, not on unrelated characteristics (for example, personal appearance or rank).

Please try to give us the most accurate and objective ratings you can give. If you have any questions, please ask the session leader.

Thank you for your cooperation.

INDIVIDUAL READINESS RATING SCALES

COOPERATION/TEAMWORK/ESPRIIT' DE CORPS

How ready is each soldier to promote teamwork and esprit' de corps?

Seldom promotes cooperation and teamwork; seldom assists others in performance of their tasks; is not very flexible about the work methods of others.	Generally cooperates with other soldiers; will usually assist others so jobs get done in timely manner; generally supports cooperation and teamwork.	In a team player; whenever necessary, assists others in performing tasks; actively promotes cooperation and teamwork; coordinates own performance with that of others.
---	--	--

Names of the soldiers you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

EFFORT AND INITIATIVE

How ready is each soldier to show extra effort and initiative?

Makes little effort to ensure job gets done; gives up easily when faced with difficult problems; reluctantly accepts responsibility; seldom anticipates problems.	Puts in effort and keeps trying when its very important to complete assignments; overcomes most obstacles; accepts responsibility when given it; anticipates potential problems.	Often volunteers to work extra hours; pushes hard to overcome all obstacles; readily assumes responsibility when necessary; identifies and attends to potential problems.
---	--	---

Names of the soldiers you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

GENERAL SOLDIERING SKILLS

How ready is each soldier to perform general soldiering tasks?

Does not display the knowledge/skills required to perform many basic or general Army tasks such as first aid, navigation, and M16 use and care.

Displays the knowledge/skills required to perform properly most basic or general Army tasks, but may need help for some tasks.

Displays the knowledge/skills to perform properly all basic or general Army tasks, such as first aid, navigation, and M16 use and care.

Names of the soldiers
you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

INDIVIDUAL DEPLOYABILITY (ARMY TASK/MISSION)

From an Army task/mission viewpoint, how ready is each soldier to be deployed?

Not likely to be ready to be deployed effectively since all his/her equipment and gear are not present or operational; whereabouts of soldier are sometimes unknown.

Deployment could be delayed or made less effective because some equipment and gear may not be present or operational; whereabouts of soldier are occasionally unknown.

Is ready to be deployed effectively because all his/her equipment and gear are present and operational; whereabouts of soldier are known at all times.

Names of the soldiers
you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

INDIVIDUAL DEPLOYABILITY (PERSONAL/FAMILY)

From the viewpoint of personal/family problems, how ready is each soldier to be deployed?

1/4 not likely to be ready to be deployed effectively since many personal or family-related problems are not under control or have not been solved.

Deployment could be less effective because some personal or family-related problems are not under control or have not been adequately solved.

Gives no indication that would not be ready to be deployed effectively; apparently all personal or family-related problems are under control or have been solved.

Names of the soldiers
you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

JOB DISCIPLINE

How ready is each soldier to complete jobs in an orderly, timely, and thorough manner?

Often does not complete jobs on time; frequently allows personal needs to interfere with job accomplishment; sometimes doesn't follow orders.

Completes most jobs on time, but sometimes allows personal needs to interfere with job accomplishments; generally follows orders.

Always maintains punctual work schedule, completes jobs on time, despite personal needs; follows orders carefully and quickly.

Names of the soldiers
you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

JOB TECHNICAL KNOWLEDGE/SKILLS

How ready is each soldier in terms of specific job technical knowledge/skills?

Does not display the knowledge/skills required to perform most job assignments and tasks properly.

Displays the knowledge/skills required to perform most job assignments and tasks properly.

Displays the knowledge/skills to perform all job assignments and tasks properly.

Names of the soldiers you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

PERFORMANCE UNDER PRESSURE AND ADVERSE CONDITIONS

How ready is each soldier to perform effectively under pressure?

Loses composure under stressful, dangerous, or adverse conditions; tends to make unsound decisions and perform job duties ineffectually under pressure or stress.

Loses some composure under stressful, dangerous, or adverse conditions; loses some ability to make sound decisions and perform job duties effectively under pressure or stress.

Maintains composure under stressful, dangerous, or adverse conditions; is able to make sound decisions and perform job duties effectively under pressure or stress.

Names of the soldiers you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

NOTE: ONLY COMPLETE THE REMAINING FOUR SCALES FOR SOLDIERS WHO ARE SUPERVISORS.

CARE AND CONCERN FOR SUBORDINATES

How ready is each supervisor to show concern for subordinates?

Often fails to provide subordinates with needed emotional support; doesn't make sure newly arrived soldiers are properly oriented; doesn't promote well-being of troops.

Usually provides subordinates with needed emotional support; generally makes sure that newly arrived soldiers are properly oriented; promotes well-being of troops.

Goes out of way to provide subordinates with needed emotional support; ensures that newly arrived soldiers are quickly oriented; actively promotes well-being of troops.

Names of the soldiers
you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

CARE AND CONCERN FOR SUBORDINATES' FAMILIES

How ready is each supervisor to show concern for subordinates' families?

Often fails to make sure newly arrived family members have adequate housing and other services; provides inadequate information and support for families in times of crisis.

Makes sure that most newly arrived family members have adequate housing and other services; generally provides families with needed information and support in times of crisis.

Ensures all newly arrived family members have adequate housing and other services; makes sure families have all needed information and support in times of crisis.

Names of the soldiers
you are rating.

1.	1	2	3	4	5	6	7
2.	1	2	3	4	5	6	7
3.	1	2	3	4	5	6	7
4.	1	2	3	4	5	6	7
5.	1	2	3	4	5	6	7
6.	1	2	3	4	5	6	7
7.	1	2	3	4	5	6	7
8.	1	2	3	4	5	6	7

LEADERSHIP OF SUBORDINATES

How ready is each supervisor to provide unit leadership?

Names of the soldiers you are rating.	Organizes and executes missions poorly; promotes unit moral ineffectually; seldom provides subordinates needed guidance; makes many poor personnel decisions; not respected by subordinates.				Adequately organizes and executes missions; generally promotes unit moral; often provides subordinates with needed guidance; often makes good personnel decisions; is looked up to by some soldiers.				Organizes and executes missions very well; actively promotes unit moral; provides subordinates with job guidance as needed; consistently makes good personnel decisions; serves as a role model for all soldiers.			
	1	2	3	4	5	6	7	8				
1. _____												
2. _____												
3. _____												
4. _____												
5. _____												
6. _____												
7. _____												
8. _____												

MAINTAINING TRAINING STATUS OF SUBORDINATES

How ready is each supervisor to make sure subordinates are well trained?

Names of the soldiers you are rating.	Is indifferent to subordinates' training needs; makes little effort to provide useful training or to steer subordinates to available training resources.		Generally helps subordinates identify their training needs and obtain remedial training; provides moderately well-organized and clear training to subordinates.		Makes sure subordinates get all neces- sary training; provides training in a constructive, comprehensive manner; provides encouragement and guidance to subordinates in need of remedial training.		
	1	2	3	4	5	6	7
1. _____							
2. _____							
3. _____							
4. _____							
5. _____							
6. _____							
7. _____							
8. _____							

APPENDIX B

Instructions to Readiness Weighting Workshop Participants¹

¹ The instruments given in this Appendix were given to officers and NCOs in combat military occupational specialties (MOS). A parallel set of instructions was given to workshop participants in combat support and combat service support MOS.

GENERAL INSTRUCTIONS

During this workshop, you will be asked to make a series of judgments concerning the composition of overall measures of individual and unit readiness. All your judgments will concern combat soldiers and units. As described earlier, the Army Family Research Project is collecting six different types of measures that reflect the readiness of individuals and two kinds of measures that reflect the capability of units to fulfill their war-time missions. We want to be able to combine these various measures into one comprehensive overall measure of individual readiness and one overall measure of unit readiness. To do this, we need your considered judgments as to the relative importance of different aspects of readiness in forming overall scores for combat soldiers and units.

Since we have many different kinds of measures, we have tried to simplify your judgmental task by breaking it into short sets of judgments. Twelve sets of judgments will involve assigning importance or relevance weights to measures of individual readiness. Five sets involve assigning weights to measures of unit readiness.

To further simplify your judgmental task, we will use the same weighting procedure for all sets of measures. This procedure has been used successfully in previous Army Research Institute research. However, in order to apply the procedure, it will be necessary for you, the judge, to first carefully examine the items, scales, or factors that are candidates for inclusion into the readiness composite.

Please do not be concerned that some of the individual measures reflect negatively on individual or unit readiness, e.g., duty time lost for personal reasons. We can easily adjust these types of measures so that low values indicate higher readiness. Also please do not be concerned if you feel that all the measures of a particular type should receive low or zero weights in forming a readiness composite. You will have an opportunity to assign all the measures of that type a low weight in making a later series of judgments. As you will shortly see, the judgment procedure allows zero weights to be assigned any measure that you feel should not be part of an overall readiness measure. The procedure also readily allows you to assign equal or tied weights to various component measures.

Remember use your best judgment at all times!

Thank you.

SPECIFIC DIRECTIONS FOR ASSIGNING READINESS WEIGHTS

The procedure for assigning weights to the readiness factors is as follows:

1. Please carefully examine the readiness measures given to you. Take note of the content of the items or scales and the source of the readiness information.
2. Rank order the set of readiness factors to be weighted in each section by assigning a "1" to the most important for an overall measure of readiness, a "2" to the next most important, etc.
3. After you have recorded the rank orders on the weighting sheet, assign 100 points to the factor you ranked as most important (the factor ranked #1). Then ask yourself, "If I'm assigning 100 points to this readiness factor, how many points should I assign to the next most important one." If, for example, you think that the second most important one should receive half the weight of the first, assign it 50 points. Continue assigning points in this manner until all the factors have been weighted.
4. In assigning the points, please keep in mind that the points represent how many times more (or less) important one readiness factor is than another. For example, if you assign 30 points to one factor and 5 points to another, that means that you believe that the 30-point factor should receive 6 times the weight in a total readiness score as the 5-point factor.
5. If you feel that two or more factors should be weighted equally, you may assign them equal weights. For example, if you feel that the factors ranked first, second, and third are really tied in importance, then you can assign each of them 100 points.
6. If you believe that a particular readiness factor should not be used at all in arriving at the overall score, you should assign it zero points.
7. When you are finished assigning points to all readiness factors, make sure that they are in correct proportion to one another. That is, the whole set of weights accurately reflects the relative importance of each of the readiness factors.
8. Please use the space at the bottom of each weighting form to record any comments you may have about the weights that you have assigned. We would be particularly interested in your reasons for assigning some readiness factors or measures very high or very low weights.
9. When satisfied with your assigned weights, please proceed to the next set of readiness factors to be weighted. Once you begin making the next set of judgments, please do not change any of your prior judgments.
10. Remember you are assigning weights to form overall readiness measures for combat soldiers and units.

Thank you for your cooperation.

Self-Ratings of Readiness

(Sets 1a, b & c)

The first set of items to be weighted were in the Soldier Survey. All sampled soldiers (officers and enlisted personnel) were asked to rate their own degree of readiness. The specific items used are presented below. After examining the items, please assign them relative weights using the weighting procedure described earlier. There are three attached weighting sheets, one for assigning weights to officers' responses, one for NCOs, and one for junior enlisted personnel (E2 to E4). Please complete all three weighting sheets.

41. If we were to go to war today, how well prepared are you to perform the tasks in your wartime job? (If you aren't sure, give your best estimate.)

- ☐ Very well prepared
- ☐ Well prepared
- ☐ Neither well nor poorly prepared
- ☐ Poorly prepared
- ☐ Very poorly prepared

42. How well prepared are you to do your assigned tasks in a conflict in which the enemy uses the following weapons? (If you aren't sure, give your best estimate.) (MARK ONE CIRCLE FOR EACH ITEM.)

Very Well Prepared	Well Prepared	Neither Well Nor Poorly Prepared	Poorly Prepared	Very Poorly Prepared
--------------------	---------------	----------------------------------	-----------------	----------------------

- | | | | | | |
|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a. Nuclear weapons | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b. Biological agents | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c. Chemical agents | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d. Conventional weapons | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

43. Compared to other soldiers in your same pay grade in your unit or place of duty, how would you rate your own job performance?

Much Better Than Most	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Much Worse Than Most
			About Average					

Name _____

Workshop _____

Weighting Sheet for Self-Ratings of Readiness
(Officers)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
41. Preparedness for wartime job	_____	_____
42. Preparedness for conflict using		
a. Nuclear weapons	_____	_____
b. Biological agents	_____	_____
c. Chemical agents	_____	_____
d. Conventional weapons	_____	_____
43. Comparison of job performance with other soldiers	_____	_____

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Self-Ratings of Readiness
(NCOs)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
41. Preparedness for wartime job	_____	_____
42. Preparedness for conflict using		
a. Nuclear weapons	_____	_____
b. Biological agents	_____	_____
c. Chemical agents	_____	_____
d. Conventional weapons	_____	_____
43. Comparison of job performance with other soldiers	_____	_____

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Self-Ratings of Readiness

(E2 to E4)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
41. Preparedness for wartime job	_____	_____
42. Preparedness for conflict using		
a. Nuclear weapons	_____	_____
b. Biological agents	_____	_____
c. Chemical agents	_____	_____
d. Conventional weapons	_____	_____
43. Comparison of job performance with other soldiers	_____	_____

Comments: _____

Self-Reports on Earlier Performance Measures

(Sets 2a, b & c)

The second set of items to be weighted were also in the Soldier Survey. The sampled soldiers were asked to indicate their earlier performance levels on several Army measures. The specific items used are attached. Note that some of the items are exclusively for officers or NCOs. After examining the items, please assign them relative weights on the three attached weighting sheets (for officers, NCOs and junior enlisted, respectively).

44. What was your last Physical Readiness Test Score?

(Scoring range from 0-300.)

☐ Don't know score

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

IF ENLISTED, CONTINUE.
IF OFFICER, SKIP TO QUESTION 49.

45. Have you ever taken a Skill Qualification Test (SQT)?

☒ Not applicable

☐ Yes ☐ No

46. What was your most recent SQT score?

☐ Don't know score

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

IF PAY GRADES E5-E9, CONTINUE.
IF PAY GRADES E1-E4 SKIP TO QUESTION 51.

47. What is the senior rater overall potential box check on your most recent NCO-ER?

1	2	3	4	5
(1)	(2)	(3)	(4)	(5)
Successful			Poor	

☒ Does not apply; I have not been rated under the NCO-ER system or I have not yet received a copy of my official rating

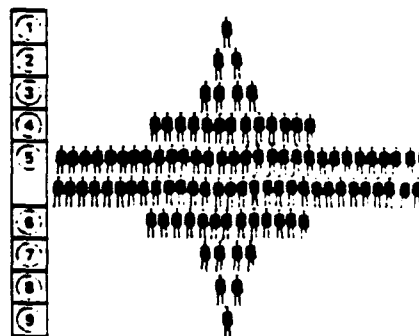
48. If you have not received an evaluation under the NCO-ER system, what is your score on your most recent EER?

☒ Does not apply; I have not been rated under the EER system.

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

SKIP TO QUESTION 51

49. What is the senior rater potential evaluation box check of you most recent OER? (MARK ONE CODE)



☒ Does not apply; I have not been rated

50. Was your last rating in, above, or below the center of mass for your senior rater?

- ☐ Above center of mass
☐ In center of mass
☐ Below center of mass
☐ Don't know

51. How many Articles 15 have you received in the past two years? (MARK ONE)

- ☐ 0
☐ 1
☐ 2
☐ 3
☐ 4 or more

52. How many FLAG Actions (that is, suspension of a favorable personnel action) have you received in the past two years? (MARK ONE)

- ☐ 0
☐ 1
☐ 2
☐ 3
☐ 4 or more

53. Have you ever received a reduction in grade?

- ☐ Does not apply
☐ Yes ☐ No

The next two questions ask about the number of Letters and/or Certificates of Appreciation, Commendation, or Achievement you have received in the past 2 years. DO NOT count letters or certificates received for the following.

- Completion of AIT or officer basic and advanced training
- Completion of any additional training courses
- Completion of Head Start
- Announcement of a promotion
- Announcement of an award or decoration

54. How many Letters of Appreciation, Commendation, or Achievement have you received in the past 2 years? (MARK ONE)

- ☐ 0 ☐ 6
☐ 1 ☐ 7
☐ 2 ☐ 8
☐ 3 ☐ 9
☐ 4 ☐ 10+
☐ 5

55. How many Certificates of Appreciation, Commendation, or Achievement have you received in the past 2 years? (MARK ONE)

- ☐ 0 ☐ 6
☐ 1 ☐ 7
☐ 2 ☐ 8
☐ 3 ☐ 9
☐ 4 ☐ 10+
☐ 5

56. How many awards and decorations have you received during all your time in the military? (Include all badges and medals, and count ones where you have received more than one of the same type.)

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

Name _____

Workshop _____

Weighting Sheet for Self-Reports on Earlier Performance Measures
(Officers)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
44. Last Physical Readiness Test Score	_____	_____
49. Most recent OER evaluation	_____	_____
50. Position in senior rater mass	_____	_____
51. Articles 15 in past two years*	_____	_____
52. FLAG Actions in past two years*	_____	_____
54. Letters of Appreciation, etc. in past two years	_____	_____
55. Certificates of Appreciation, etc. in past two years	_____	_____
56. Awards and decorations received in the military	_____	_____

* Will be scored so that low values indicate greater readiness.

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Self-Reports on Earlier Performance Measures

(NCOs)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
44. Last Physical Readiness Test Score	_____	_____
49. Most recent OER evaluation	_____	_____
50. Position in senior rater mass	_____	_____
51. Articles 15 in past two years*	_____	_____
52. FLAG Actions in past two years*	_____	_____
54. Letters of Appreciation, etc. in past two years	_____	_____
55. Certificates of Appreciation, etc. in past two years	_____	_____
56. Awards and decorations received in the military	_____	_____

* Will be scored so that low values indicate greater readiness.

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Self-Reports on Earlier Performance Measures

(E2 to E4)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
44. Last Physical Readiness Test Score	_____	_____
49. Most recent OER evaluation	_____	_____
50. Position in senior rater mass	_____	_____
51. Articles 15 in past two years*	_____	_____
52. FLAG Actions in past two years*	_____	_____
54. Letters of Appreciation, etc. in past two years	_____	_____
55. Certificates of Appreciation, etc. in past two years	_____	_____
56. Awards and decorations received in the military	_____	_____

* Will be scored so that low values indicate greater readiness.

Comments: _____

Supervisory Ratings of Readiness

(Sets 3a, b, & c)

Each of the sampled soldiers was rated by his/her first and second line supervisors. The officers and NCOs were generally rated on 12 readiness scales, 4 of which involve supervisory skills. The junior enlisted personnel (E2 to E4) were generally rated on only 8 of the 12 scales. Examples of the scales used are attached.*

The first and second line supervisors made their evaluations of a given soldier independently. The readiness score for a sampled soldier on any one of the rating scales will be the average of the first and second line supervisors' ratings.

* See Appendix A for the set of scales.

Name _____

Workshop _____

Weighting Sheet for Supervisory Ratings of Readiness

(Officers)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
Cooperation/Teamwork/Esprit' De Corps	_____	_____
Effort and Initiative	_____	_____
General Soldering Skills	_____	_____
Individual Deployability (Army Task/Mission)	_____	_____
Individual Deployability (Personal/Family)	_____	_____
Job Discipline	_____	_____
Job Technical Knowledge/Skills	_____	_____
Performance Under Pressure and Adverse Conditions	_____	_____
Care and Concern for Subordinates	_____	_____
Care and Concern for Subordinates' Families	_____	_____
Leadership of Subordinates	_____	_____
Maintaining Training Status of Subordinates	_____	_____

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Supervisory Ratings of Readiness
(NCOs)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
Cooperation/Teamwork/Esprit' De Corps	_____	_____
Effort and Initiative	_____	_____
General Soldering Skills	_____	_____
Individual Deployability (Army Task/Mission)	_____	_____
Individual Deployability (Personal/Family)	_____	_____
Job Discipline	_____	_____
Job Technical Knowledge/Skills	_____	_____
Performance Under Pressure and Adverse Conditions	_____	_____
Care and Concern for Subordinates	_____	_____
Care and Concern for Subordinates' Families	_____	_____
Leadership of Subordinates	_____	_____
Maintaining Training Status of Subordinates	_____	_____

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Supervisory Ratings of Readiness

(E2 to E4)

<u>Readiness Factor</u>	<u>Order</u>	<u>Rank Weight</u>
Cooperation/Teamwork/Esprit' De Corps	_____	_____
Effort and Initiative	_____	_____
General Soldering Skills	_____	_____
Individual Deployability (Army Task/Mission)	_____	_____
Individual Deployability (Personal/Family)	_____	_____
Job Discipline	_____	_____
Job Technical Knowledge/Skills	_____	_____
Performance Under Pressure and Adverse Conditions	_____	_____

Comments: _____

Overall Readiness Measures

(Sets 4a, b, & c)

In addition to the supervisory and self-ratings and the self-reports on earlier performance, three other types of readiness measures may be used in arriving at an overall comprehensive measure of readiness:

- 1) A measure of promotion rate based on data in the Officer or Enlisted Master File;
- 2) An overall assessment of each sampled soldier's job performance given by the soldier's unit commander; and
- 3) The amount of time in the last month that the soldier reported taking off from duty (not including pass or leave time).

Further descriptions of these three additional types of readiness measures are attached. Please examine them carefully before assigning the last sets of weights for determining overall individual readiness for officers, NCOs, and E2 to E4 soldiers. Also please review the content of the three previous sets of readiness measures.

PROMOTION RATE

Promotion rate will be obtained through first calculating the amount of time each soldier spent at each previous grade level. Next these times will be averaged to obtain a mean time within grade for each soldier. Finally, the mean time within grade for all sampled soldiers at the same current grade will be compared and determination made as to whether each soldier is being promoted at a faster or slower rate than other soldiers of the same grade. This means, for example, that majors will be compared with other majors, captains with captains, etc. Special adjustments will be made for soldiers who received a reduction in grade.

UNIT COMMANDER'S RATINGS

The commander of each unit was given a list of all the soldiers sampled from within the unit. The list contained on the average about 30 soldiers. The commander was asked to assess each soldier's job performance using the rating scale shown below. Since some of the officers assigned to some units had higher grades than the unit commander, the commander could decline to rate these officers.

SOLDIER JOB PERFORMANCE

Overall, the command's assessment of the soldier's job performance is that this soldier is ...

One of the Best	Above Average	Average	Below Average	One of the Worst
01	02	03	04	05

TIME OFF DUTY LAST MONTH

The amount of time taken off from duty in the last month will be derived from Question 38 of the Soldier Survey (see below). In arriving at an overall readiness measure, low amounts of time taken off from duty will indicate greater readiness.

38. In the last month, how much time did you take off from duty for the following reasons? (Please count time when you were sick, arrived late, or left early, but do NOT include pass or leave time.)

	Does Not Apply	Did Not Take Off Any Time	If Less Than One Day How Many Hours?					If One Day or More How Many Days?			
			1	2	3	4-5	6-7	1	2	3+	
a. Problem with transportation to duty location (for example, car wouldn't start or bus was late)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. My health (for example, sick call or doctor/dentist appointment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Taking care of child(ren) because regular care was not available (NA)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Other care of child(ren) (for example, sick child or visit to school) (NA)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. To help spouse (for example, take spouse to doctor appointment) (NA)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. To take care of personal or family business (for example, financial matters or housing problems)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Other personal or family reasons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Name _____

Workshop _____

Weighting Sheet for Overall Readiness Measures

(Officers)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
Self-Rating Composite	_____	_____
Self-Report Composite	_____	_____
Supervisory Rating Composite	_____	_____
Promotion Rate	_____	_____
Unit Commander Rating	_____	_____
Time Off Duty Last Month*	_____	_____

* Will be scored so that low values indicate greater readiness.

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Overall Readiness Measures

(NCOs)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
Self-Rating Composite	_____	_____
Self-Report Composite	_____	_____
Supervisory Rating Composite	_____	_____
Promotion Rate	_____	_____
Unit Commander Rating	_____	_____
Time Off Duty Last Month*	_____	_____

* Will be scored so that low values indicate greater readiness.

Comments: _____

Name _____

Workshop _____

Weighting Sheet for Overall Readiness Measures

(E2 to E4)

<u>Readiness Factor</u>	<u>Rank Order</u>	<u>Weight</u>
Self-Rating Composite	_____	_____
Self-Report Composite	_____	_____
Supervisory Rating Composite	_____	_____
Promotion Rate	_____	_____
Unit Commander Rating	_____	_____
Time Off Duty Last Month*	_____	_____

* Will be scored so that low values indicate greater readiness.

Comments: _____

